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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

CHENG, PETER L

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/676,587	Applicant(s) KRABbenhOFT, UWE-JENS	
	Examiner PETER L. CHENG	Art Unit 2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 March 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on **3/26/2008** has been entered.

Response to Arguments

2. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

3. Claim 4 is objected to because of the following informalities:

- **Line 4:** “the value range” lacks antecedent basis;

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1 – 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over **DECKER [US Patent 6,281,984 B1]** in view of **FISCHER [US Patent 6,891,649 B1]** and **ROLLESTON [US Patent 5,483,360]**.

As for claim 1, DECKER teaches a method for producing a printing process adaptation with which color values of a first printing process are converted into color values of a

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second printing process so that black build-up of the first printing process being substantially transferred into the second printing process and *visual impressions* of printed colors in the first and second printing processes being substantially identical

[DECKER's invention converts an "externally defined four dimensional colorant (CMYK) into an equivalent four dimensional colorant (C'M'Y'K') that takes into consideration the colors and capabilities of the given printer that is to perform the printing functions"; **col. 6, lines 43 – 47.**

The *externally defined CMYK* corresponds to the instant application's *color values of a first printing process*, and the *equivalent C'M'Y'K'* corresponds to the instant application's *color values of a second printing process.*],

which comprises the steps of:

~~performing a first printing process adaptation without maintaining the black build-up for transforming all the color values of the first printing process into transformed color values of the second printing process;~~

performing a second printing process adaptation while maintaining the black build-up for transforming all the color values of the first printing process into further transformed color values of the second printing process

[In a manner similar to the instant application, DECKER teaches the generation of a color transform table, $CMYK \rightarrow C'M'Y'K'$; **col. 11, line 25.**

The black (K) channel is maintained by means of a transform, $K \rightarrow L^* \rightarrow K'$; **col. 11, lines 21 – 22.** DECKER explains, “A K value from the standard (where $C=0$, $M=0$, and $Y=0$) is used along with its corresponding L^* value. This L^* value is then used to determine a corresponding K' value for the printer”; **col. 9, lines 43 – 46.**

“For example, if the standard has a specified L^* value for $C=0$, $M=0$, $Y=0$, and $K=0.20$, the converted K' value, (*which has the same L^* value*), for the printer may be $K'=0.22$. Likewise, for each of the incremental percentages used by the standard for the K value, an equivalent K' value for the printer is determined”; **col. 10, lines 10 – 16.**

Next, DECKER teaches printing and measuring a *first group* of patches having “predetermined combinations of varying percentages of cyan, magenta, and yellow at $K'=0$ ”; **col. 10, lines 19 – 21.**

This is followed by the printing and measuring of a *second group* of patches with varying percentages of black (K'); **col. 10, lines 35 – 39.** “For example, if K' was determined to be 0.11”, the patches of “cyan, magenta, and yellow printed out by

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the printer would be printed out with black (K') at 11% instead of 10%. The $L^*a^*b^*$ of each of these patches are measured to get a transformation relationship from $L^*a^*b^*$ to $(C'M'Y')K'$ of the printer but with $K'=0.11$ "; **col. 10, lines 46 – 52.**

From the *first and second group of patches*, "all of these $L^*a^*b^*$ values are inputted into an inversion/interpolation program 108 to create a lookup table, 110. There may be several lookup tables created, where one lookup table is created for each value of K (K')"; **col. 11, lines 2 – 5.** In **col. 11, lines 6 – 20**, DECKER illustrates two $CMY \rightarrow C'M'Y'$ tables for $K=0/K'=0$ and $K=0.10/K'=0.11$. However, as noted there may be several such lookup tables.

As previously noted, these tables are then combined with the transform, $K \rightarrow L^* \rightarrow K'$ [**col. 11, lines 21 - 22**] to form color transform table $CMYK \rightarrow C'M'Y'K'$; **col. 11, lines 24 - 26**];

~~and performing a third printing process adaptation for transforming all the color values of the first printing process into additional transformed color values of the second printing process by performing a weighted averaging of the transformed color values of the first printing process adaptation and of the further transformed color values of the second printing process adaptation.~~

However, DECKER does not specifically teach

performing a first printing process adaptation *without maintaining the black build-up* for transforming all the color values of the first printing process into *transformed color values* of the second printing process;

and performing a third printing process adaptation for transforming all the color values of the first printing process into *additional transformed color values* of the second printing process by performing a weighted averaging of the transformed color values of the first printing process adaptation and of the further transformed color values of the second printing process adaptation.

FISCHER's invention is "directed to a system and method for constrained multi-dimensional color transformation"; **col. 1, lines 51 – 52**. "With a constrained multi-dimensional color transformation, a destination device, such as a color proofer, can provide an accurate color match relative to a source or 'target' device, such as a printing press. In particular the constraints can *preserve selected color information* that is present in an image produced by the source device, and prevent addition of other selected color information that would not be present in the source device image"; **col. 1, lines 60 – 67**.

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FISCHER's *source or target device* and *destination device* correspond respectively to the instant application's *first printing process* and *second printing process*. That is, like DECKER, FISCHER teaches a color transformation of CMYK color values of a *first printing process* into C'M'Y'K color values of a *second printing process*.

However, unlike DECKER, and similar to the instant application, FISCHER replaces the printing and measuring of color patches with an iterative search of the “forward models” of the device profiles of the first and second printing processes. FISCHER cites, “To produce destination data in destination device-dependent coordinates, e.g., CMYK, processor 12 performs a search of destination device-dependent coordinates that, when applied to the forward model for the destination device, approximate the device-independent coordinates generated for the source data”; **col. 4, lines 27 - 33**. In addition, a “search module 28 seeks destination device coordinates that minimize the calculated error” [**col. 4, lines 45 - 46**] between “the device-independent coordinates for the source device and those for the destination device”; **col. 4, lines 41 – 43**. “The process continues in an iterative manner until the calculated error is reduced to an acceptable degree”; **col. 4, lines 46 – 48**.

As with the instant application, FISCHER teaches that “unconstrained multi-dimensional transforms, such as are typical of ICC device link profiles, can provide excellent color fidelity but may add or remove dots with respect to the proofing target”; **col. 8, lines 21 – 24**. “In particular, unconstrained multi-dimensional transformation can result in

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substitution and removal of particular colorants in the destination image relative to the colors specified in the source image”; **col. 2, lines 7 – 11.**

FISCHER’s *unconstrained multi-dimensional transform* (e.g., a typical ICC device link profile) corresponds to the instant application’s first printing process adaptation.

Contrary to an unconstrained multi-dimensional color transformation (e.g., a typical ICC device link profile), FISCHER teaches that a constrained multi-dimensional transform (CMT) “preserves the presence and absence of colorants from input to output, and provides more accurate color matching”; **col. 2, lines 23 – 25.** FISCHER further cites, “For a CMYK source to CMYK destination transformation, the K versus CMY tradeoff can be constrained by maintaining the integrity of the black channel”; **col. 5, lines 40 – 43.**

FISCHER’s *constrained multi-dimensional transform (CMT)* which maintains the integrity of the black channel corresponds to the second printing process adaptation as taught by both DECKER and by the instant application.

FISCHER further teaches that a “smooth transition” (corresponding to the instant application’s third printing process adaptation) “can be implemented ... by interpolating between the constrained and unconstrained cases”; **col. 7, lines 33 – 35.**

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ROLLESTON teaches a method of producing a *blended* color transform that achieves a *smooth transition* between two or more separate color transforms. ROLLESTON's method generates "a color space transform lookup table derived from printer calibration measurements using separate table generations to produce the functionality of a single lookup table"; **col. 3, lines 54 – 57**. ROLLESTON refers to the resultant single lookup table as a "blended lookup table".

In **col. 7, line 1**, ROLLESTON teaches a special case of blending two lookup tables as

$$\text{LUT}_{\text{NEW}}(r, g, b) = A(r, g, b) * \text{LUT1}(r, g, b) + [1 - A(r, g, b)] * \text{LUT2}(r, g, b)$$

"where LUT1() and LUT2() are the values of the first and second LUT's at some location (i.e., r, g, b) in the table" and the weighting function A(r, g, b) "is a function of the table location such that $0 \leq A \leq 1$ "; **col. 7, lines 3 – 5**.

ROLLESTON teaches that "(r, g, b)" are colorimetric values and "may be in terms of CIE color space (rgb), or the $L^*a^*b^*$, or luminance-chrominance space (LC_1C_2)"; **col. 4, lines 44 – 46**. ROLLESTON further teaches that the colorimetric "color signals R_c, G_c, B_c are processed to generate address entries to a table therein which stores a set of transform coefficients with which the signals R_c, G_c, B_c may be processed to convert them to C_x, M_x, Y_x colorant signals or any multi-dimensional output color space including but not limited to CMYK or spectral data"; **col. 5, lines 1 – 7**.

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In addition, ROLLESTON asserts that even though a device independent color space (i.e., CIE RGB, L*a*b*, or LC₁C₂) to a device dependent color space (i.e., C_x M_x Y_x or C_x M_x Y_x K_x) conversion is described, “the invention applies equally as well to conversions to any transformation from a first space to a second space, irrespective of the nature of the space as device dependent or not”; **col. 7, lines 31 – 37.**

That is, the *blended lookup table*, LUT_{NEW}, may also have the form:

$$\begin{aligned} \text{LUT}_{\text{NEW}}(\text{C}, \text{M}, \text{Y}, \text{K}) &= \text{A}(\text{C}, \text{M}, \text{Y}, \text{K}) * \text{LUT1}(\text{C}, \text{M}, \text{Y}, \text{K}) \\ &+ [1 - \text{A}(\text{C}, \text{M}, \text{Y}, \text{K})] * \text{LUT2}(\text{C}, \text{M}, \text{Y}, \text{K}) \end{aligned}$$

where LUT_{NEW}(), L1() and L2() produce *new* C', M', Y' and K' values, and the weighting function A() is a function of the input C, M, Y and K values.

In summary, DECKER teaches a *second printing process adaptation of maintaining the black build-up* by constraining the black (K') color values of the second printing process to values which have the same lightness (L*) as black (K) color values of the first printing process.

FISCHER teaches the conventional *first printing process adaptation* (i.e., an *unconstrained multi-dimensional transform*; e.g., an ICC device link profile) and a *second printing process adaptation* of “maintaining the integrity of the black channel” by means of a *constrained multi-dimensional transform*. FISCHER further teaches

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combining the *unconstrained* and *constrained transforms*, similar to the instant application's *third printing process adaptation*, so that a "smooth transition" occurs between the two cases.

ROLLESTON teaches a method of *blending* separate color transforms by using a *weighted averaging* of the separate color transforms.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of FISCHER and ROLLESTON with those of DECKER and provide a *third printing process adaptation* for transforming *all the color values of the first printing process into additional transformed color values of the second printing process by performing a weighted averaging of the transformed color values of the first printing process adaptation and of the further transformed color values of the second printing process adaptation* so that a "smooth transition" could be implemented between the *first and second printing process adaptations*.

Regarding claim 2, DECKER *does not specifically teach* the method according to claim 1, which further comprises

carrying out the weighted averaging with a weighting function $f(C1, M1, Y1)$ derived from a proportion of chromatic printing inks in colors of the first printing process.

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However, as noted for claim 1, ROLLESTON teaches a method of *blending* color transforms with a weighting function $A()$ which may be a function of the color values C, M, Y and K of the first printing process. Weighting function $A()$ is also a function of color values C, M and Y.

Regarding claim 3, DECKER *does not specifically teach* the method according to claim 2, which further comprises:

allocating a higher weighting factor to the colors of the first printing process with a high proportion of the chromatic printing inks;

and allocating a lower weighting factor to the colors with a low proportion of the chromatic printing inks.

As noted for claim 1, FISCHER further teaches that a “smooth transition” (corresponding to the instant application’s third printing process adaptation) “can be implemented ... by interpolating between the constrained and unconstrained cases”; **col. 7, lines 33 – 35.**

In an example, FISCHER teaches “when a region of the source image contemplates the printing of a single-color black, i.e., when only the K channel is specified, the ‘do not add chromatic colorants’ constraint” (i.e., the black (K) channel preserving constraint) “is applied” and “when there is no single-color black in the source image, the ‘full multi-

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dimensional' constraint condition is applied"; **col. 7, lines 21 – 27**. That is, FISCHER teaches a *blended* transform composed of "black only" (i.e., $K \neq 0$, $C = 0$, $M = 0$, $Y = 0$) and "no single-color black" (i.e., $K = 0$, $C \neq 0$, $M \neq 0$, $Y \neq 0$) cases.

With respect to ROLLESTON's teachings, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement a weighting function which allocated *a higher weighting factor to the colors of the first printing process with a high proportion of the chromatic printing inks* so that the "no single-color black" transform would be weighted more than the "black only" transform when a color of the first printing process contained a high proportion of the chromatic printing inks, and similarly, implement a weighting function which allocated *a lower weighting factor to the colors with a low proportion of the chromatic printing inks* so that the "black only" transform would be weighted more than the "no single-color black" transform when a color of the first printing process contained a low proportion of the chromatic printing inks.

Allowable Subject Matter

7. Claims 4 – 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter L. Cheng whose telephone number is 571-270-3007. The examiner can normally be reached on MONDAY - FRIDAY, 8:30 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, King Y. Poon can be reached on 571-272-7440. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/King Y. Poon/

Supervisory Patent Examiner, Art Unit 2625

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June 9, 2008